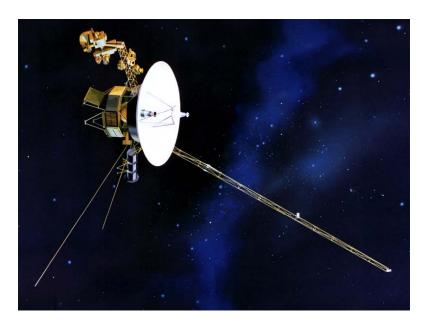


### Horizon 2000





#### November 1980

# Voyager 1



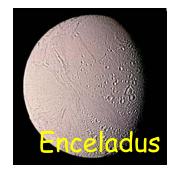


### Titan

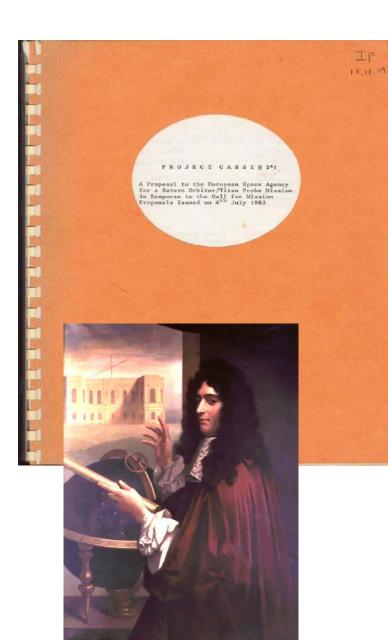










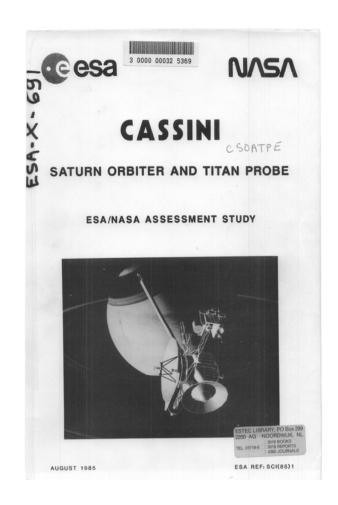


The Saturn Orbitar/Titan probe mission is proposed by: D. Gautier (2) and W.-H. Ip (1) (coordinators) S.J. Bauer (3) A. Boischot (2) P. Bruston (4) F. Bühler (5) E. Keppler(1) B. Klecker(11) B. Klecker
D. Krankovsky
G. Hagni
Ph. Masson(12) H. Combes (2)
R. Courtin (2) Ph. Masson(12)
J.A.M. McDonnell(13)
S. McKenna-Laplor(14)
G. Mortill(11)
G. Neukam(15)
F. Raulin(16)
J.J. Southwood(10)
G. Valsacchi(77) R. Courtin(2)
M. Bobrowelly(2)
T. Energenas(2)
M. Fitaire(18)
E. Grün(8)
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(8) MPI für Kernphysik, FRG
(9) Institut für Flugmedizin, DEVLE, Köln, FRG
(10) Imperial College of Science and Technology, The Blackett Laboratory, UK
(11) MPI für sutraterrestrische FMysik, FRG
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FRANCE (1) MPI für Aeronomie, FRG (17) Instituto Astrofisica Spaziale, Reparto de Planetologia, Viale Università. (18) Laboratoire de Physique des Gaz et des Plasmas, Université de Paris-Sud.

### Project Cassini November 1982

#### - 64 -**ALTITUDE** ENTRY SPEED = 7,1 Km / sec. 1000 Km PEAK HEAT FLUX 53 W / cm 2 PEAK DECELERATION 21g BEGINNING OF ATMOSPHERIC FRICTION 500 Km AMARIAN UV ABSORBING LAYER OPTICAL HAZE LAYER 300 Km OPTICAL LIMB DECELERATOR JETTISON 173 Km PILOT CHUTE DEPLOY. AFTER COVER SEPARATED MAIN CHUTE DEPLOYED MAIN CHUTE EXTRACTED INSTRUMENTS INLET - PORTS OPENED 170 Km SCIENCE ATMOSPHERE 100 Km PROBE PERFORMS PROBE IMPACTS ON SURFACE SURFACE SCIENCE E+ 0' TIME FROM ENTRY Figure 6.7: Probe descent profile and scenario

# Mission concept (1985)



# The time of decision (Bruges, 25-27 October 1988)

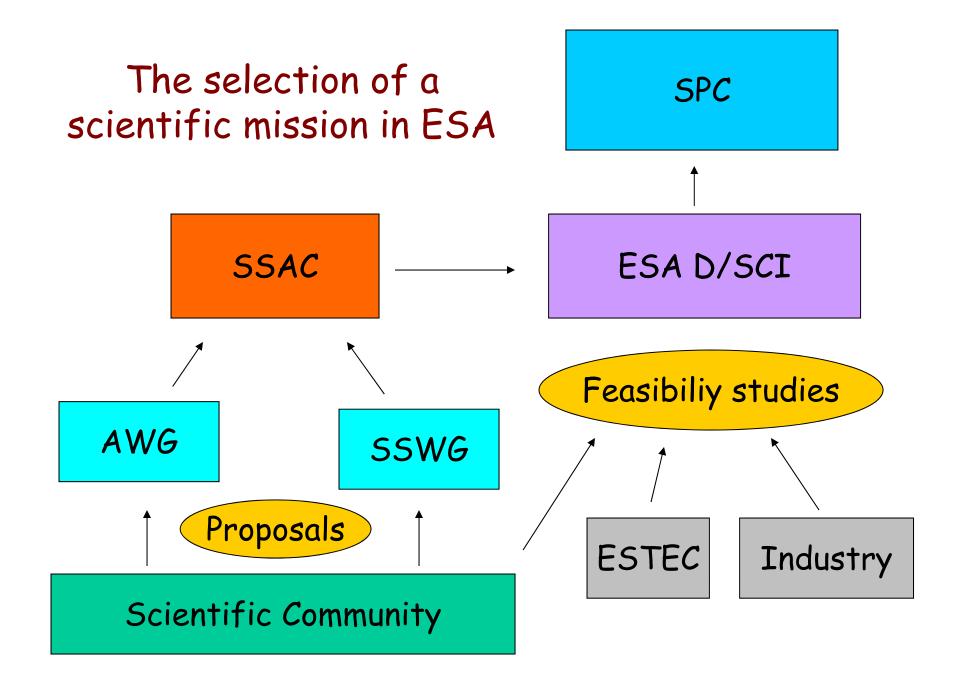
Cassini Saturn and Titan

Vesta Asteroids and comets

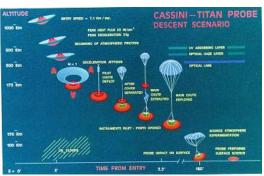
Quasat Radio astronomy VLBI

Grasp Gamma ray astronomy

Lyman UV astronomy

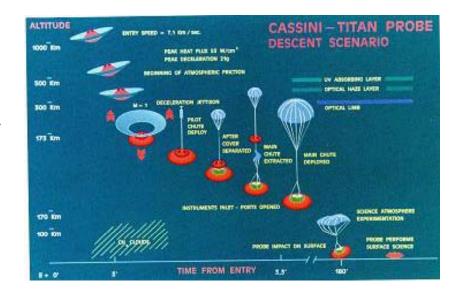






Cassini / Titan probe

# The choice of the SSWG

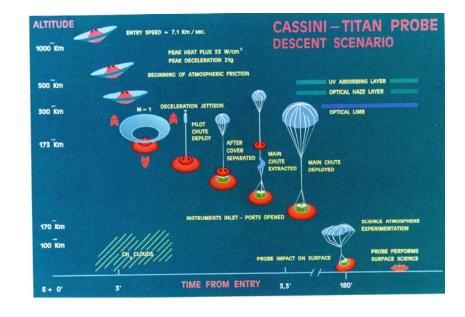


GRASP



Cassini / Titan probe

# The choice of the SSAC





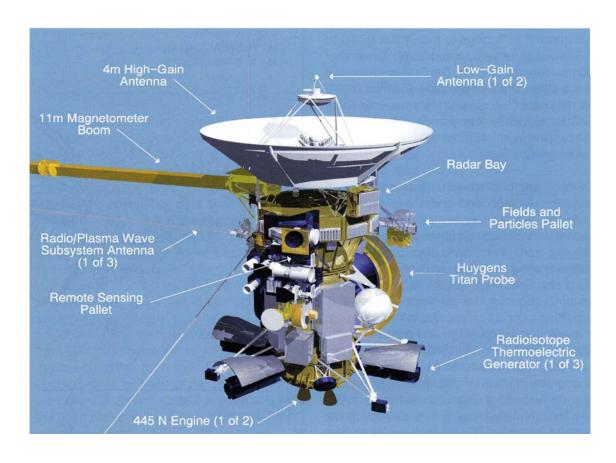
### One year later in America ...



Mariner Mark II

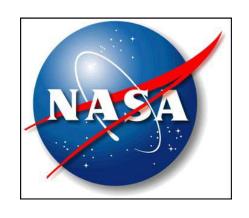
October 1989: Congress approval of the CRAF/Cassini program

## The Cassini spacecraft



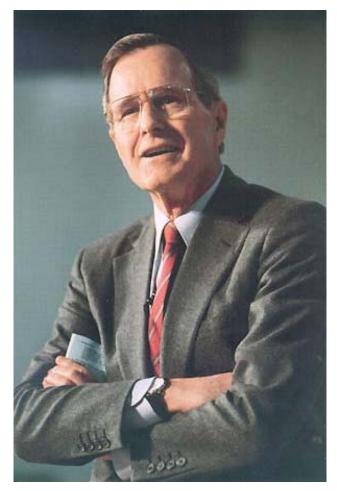
Planned launch: November 1995

#### ESA/NASA collaboration





Memorandum of Understanding (17 december 1990)



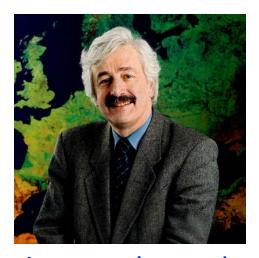
George Bush Sr.

Richard Truly

#### Crisis in the United States (1991-92)

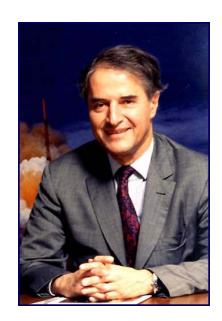


# Protests in Europe



D. Southwood (Chair SSAC)

"This is not in the spirit of the MOU!"



J.-M. Luton (ESA DG)

"An intolerable stress ... I cannot emphasize enough the change this can easily induce in the climate of cooperation"

### Protests in Europe

"Commiments [must] be honoured"

"It should be impressed upon NASA that international cooperation is a valid proposition only as long as the partners honoured their commitments"

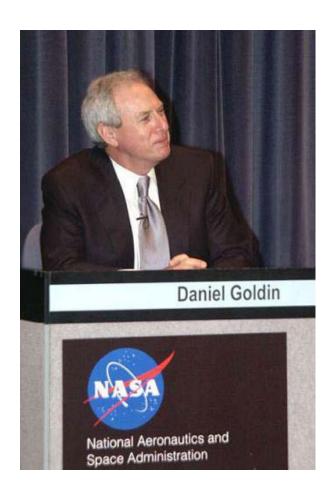




H. Habing (SSAC)

"There is a breaking-point at which it is no longer possible to continue, and ESA is very close to this point"

# Crisis in the United States (1994)



Faster, cheaper, better

#### Cancel Cassini?

"If a choice had to be made between AXAF and Cassini, international cooperation would be a secondary consideration, compared to the relative weight of the various pressure groups ...



The overall impression is one of total uncertainty ...

It would be very imprudent for ESA to depend too strongly on NASA for its long term future projects"

L. Woltijer (SSAC chair)

### Reactions in Europe



J.-M. Luton (ESA D.G.)

"Europe views any prospect of a unilateral withdrawal from cooperation on the part of the United States as totally unacceptable. Such an action would call into question the reliability of the U.S. as a partner in any future major scientific and technological cooperation"

Al Gore (US vice president)

#### Reactions in Europe







H. Holbein (1533)
The ambassadors



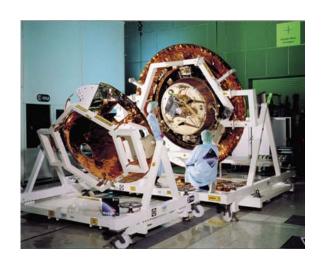
Go ahead!

... but after an independent review by external experts

"... An unacceptable violation of the cooperative spirit"



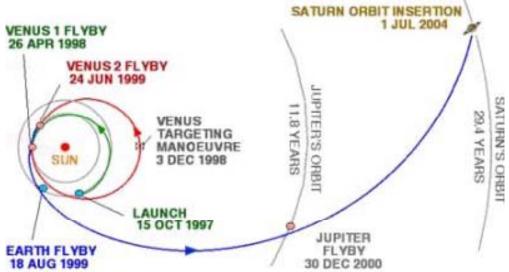
# Assembling



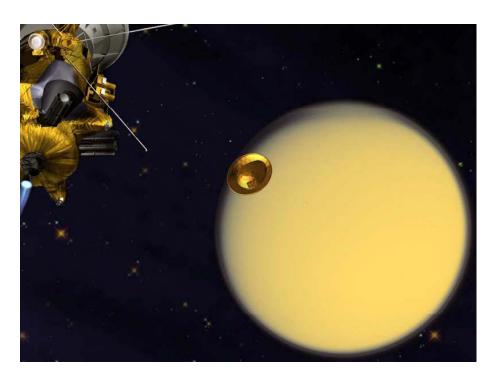




#### Launch (15 october 1997)



# Huygens release

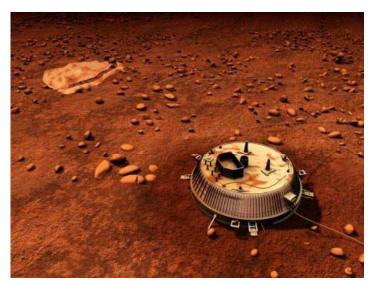


24 december 2004



#### Parachuting onto another world





14 January 2005

# A postcard from Titan

